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example. The connecting section 30 is used for connecting to a connecting section 70 of the second hinge part 50, as shown in FIG. 3a. The second hinge part 50 also has an anchoring section 72. The anchoring section 72 can be fixedly or movably mounted on the second device part, for example. In order to achieve the sliding and rotating motion between the connecting sections 30 and 70, each of the connecting sections 30 and 70 is substantially cylindrical in shape and has a circular cross section, as shown in FIG. 2b and FIG. 3b. The first hinge part 10 has an optical fiber 20 and the second hinge part 50 has an optical fiber 60 located substantially at the center of radius of the corresponding connecting sections in order to convey optical signals when the first and second hinge parts 10 and 50 are engaged with each other. As shown in FIG. 2b, the connecting section 30 has a first cylindrical layer of electrically conductive material 18 surrounding the optical fiber 20. The connecting section 30 also has a second cylindrical layer of electrically conductive material 14 concentrically disposed around the first conductive layer 18, leaving a concentric space 24 between the first and second conductive layers 14 and 18. It is advantageous to have a jacket 12 outside the second conductive layer 14 to keep out dust, for example. The anchoring section 32, as shown in FIG. 2c, is basically the same as the connecting sections 30 except that an insulation layer 16 is used to fill the space between the first and second conductive layers 14 and 18. It should be noted that the cross section of the anchoring section 32 can be circular or in another shape so that the first conductive layer 18 and the second conductive layer 14 can be connected to a printed wire board or a chassis, for example. The optical fiber 20 is operatively connected to an opto-electrical component.

As shown in FIG. 3b, the connecting section 70 has a first cylindrical layer of electrically conductive material 56 and a second cylindrical layer of electrically conductive layer 52. The first conductive layer 56 is basically a cylindrical tube with an inner diameter defining an empty space 64. The inner diameter is substantially equal to the outer diameter of the first conductive layer 18 of the connecting section 30. The second conductive layer 52 is basically a cylindrical tube with an outer diameter substantially equal to the inner diameter of the second conductive layer 14 of the connecting section 30. An insulation layer 54 is provided between the first and second conductive layers 52 and 56. As such, when the first and second hinge parts are engaged with each other, the concentric layers 52, 54 and 56 of connecting section 70 of the second hinge part 50 are inserted into the space 24 of the connecting section 30 of the first hinge part 10, and the optical fiber 20 and the surrounding conductive layer 18 of the connecting section 30 are inserted into the space 64 of the connecting section 70. In the connecting section 70 of the second hinge part 50, the optical fiber 60 is disposed at the end of the empty space 64. When the first and second hinge parts 10 and 50 are engaged with each other, the first conductive layer 56 is in electrical contact with the first conductive layer 18 and the second conductive layer 52 is in electrical contact with the second conductive layer 14 to provide electrical connections between the two hinge parts. Furthermore, optical signals can be conveyed between the optical fiber 60 and the optical fiber 20 whether these optical fibers are in contact with each other. The anchoring section 72, as shown in FIG. 3c, is basically the same as the connecting section 70 except that the inner part of the first conductive layer 56 is filled with the optical fiber 60 and an insulation layer 58. It should be noted that the cross section of the anchoring section 72 can be circular or in another shape so that the first conductive layer 56 and the second

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conductive layer 52 can be connected to a printed wire board or a chassis, for example. The optical fiber 60 is operatively connected to an opto-electrical component.

FIGS. 4a and 4b are different views of the optical hinge 1 when the connecting section 70 of the second hinge part 50 is partially inserted into the connecting section 30 of the first hinge part 10. FIGS. 4c and 4d are different views of the optical hinge 1 when the connecting section 70 of the second hinge part 50 is fully inserted into the connecting section 30 of the first hinge part 10. It should be noted that so long as the connecting section 70 is coupled to the connecting section 30, the electrical contacts between the first hinge part 10 and the second hinge part 50 can be maintained and the optical communications between the first and second hinge parts can also be maintained. The same is true when the first and second hinge parts are rotated against each other, as shown in FIGS. 4e and 4f.

As the optical and electrical conduits can be maintained while the hinge parts undergo sliding motions and rotational motions, the optical hinge 1 can be implemented in many different ways between two device parts. For example, in an electronic device 100 having a first device part 110 and a second device part 150, the entire first hinge part 10 is mounted in an indent section of the first device part 110, and the entire second hinge part 50 is mounted in an indent section of the second part 150. FIG. 6a shows a different view of the electronic device 100 in an open position, and FIG. 6b shows the electronic device 100 in a closed position. When the electronic device 100 is in the open position, the connecting section 70 is only partially inserted in the connecting section 30.

The optical hinge can be implemented on an electronic device in a different way, as shown in FIG. 7. As shown in FIG. 7, the electronic device 200 has a first device part 210 and a second device part 250. The connecting section 30 of the first hinge part 10 is disposed in an indent section of the first device part 210, but the anchoring section 32 is mounted through the device part 210. Likewise, the connecting section 70 of the second hinge part 50 is disposed in an indent section of the second device part 250, but the anchoring section 72 is mounted through the second device part 250. In this configuration, the first hinge part 10 is allowed to rotate along the y axis against the first device part 210 and the second hinge part 50 is allowed to rotate along the y axis against the second device part 250.

FIG. 8a shows a different view of the electronic device 200 in an open position, and FIG. 8b shows the electronic device 200 in a closed position. When the electronic device 200 is in the open position, the connecting section 70 is only partially inserted in the connecting section 30. When the electronic device 200 is in the closed position, the connecting section 70 is further inserted into the connecting section 30. As the same time, both the first hinge part 10 and the second hinge part 50 are rotated in a counter-clockwise direction.

In an electronic device such as a clamshell phone, the optical hinge can be implemented in yet another different way. As shown in FIGS. 9a to 9d, the electronic device 300 has a first device part 310 and a second device part 350. The anchoring section 32 of the first hinge part is mounted on the first device part 310 depth-wise and the anchoring section 72 of the second hinge part is mounted on the second device part 350 lengthwise. The engaged connecting parts 30 and 70 (see FIGS. 4a and 4b) serve as pivot to allow the second device part 350 to rotate along the z direction (not shown) to open the electronic device 300, from a closed position as shown in FIG. 9a to various open positions as shown in